

**LARGIDEA DAVISI KNIGHT, A RARELY COLLECTED PLANT BUG
(HEMIPTERA: MIRIDAE: DERAEOCORINAE) ASSOCIATED WITH PITCH
PINE IN THE NORTHEASTERN UNITED STATES**

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Abstract.—Described in 1917 and known previously only from Cape Cod, Massachusetts, and Long Island and near New York City, New York (ca. 14 specimens), the deraeocorine mirid *Largidea davisii* Knight is newly reported from Connecticut, Maine, New Hampshire, New Jersey, Pennsylvania, and Rhode Island. Additional records are given for Massachusetts and New York. This univoltine predator was found only on pitch pine (*Pinus rigida* Mill.), typically in extensive and remnant pine barrens. The gall-forming margarodid scale *Matsucoccus gallicolus* Morrison is suggested as prey of this late-season plant bug.

Key Words: Insecta, Miridae, Deraeocorinae, Clivinematini, new records, *Pinus rigida*, pine barrens, *Matsucoccus* scales

Largidea davisii Knight is the only eastern member of a Nearctic genus of plant bugs. The other nine species of *Largidea* are essentially restricted to western North America (one Illinois specimen, collected in 1895, is known of the otherwise western *L. grossa* Van Duzee [Knight 1941]). A mirid of the deraeocorine tribe Clivinematini, *L. davisii* has been termed a rare heteropteran of the northeastern fauna (Slater 1974) and has remained poorly represented in collections since its original description (Knight 1917). Here I give new distribution records for this apparently predacious plant bug, provide notes on its seasonal occurrence and plant associations, and suggest a predator-prey relationship.

Largidea davisii Knight
(Figs. 1, 2)

This dark reddish-brown, elongate-oval mirid, 6.0–6.5 mm long, can be recognized by the matted, pale yellow pubescence on

its body; its short rostrum that is extended only to or slightly beyond the posterior margin of the forecoxae; the incrassate (♀) or linearly thickened (♂) second antennal segment, with the third and fourth segments short (0.37 mm) and thin; the coarsely and densely punctate pronotum with an impressed line, smooth and hook-shaped, from the anterolateral angle to the posterior margin of the calli; and the broad, flattened basal tarsomere that is extended under the second tarsomere. For a diagnosis and description of the tribe Clivinematini, see Ferreira's (2000) taxonomic review.

DISTRIBUTION

Historical.—Described from Promised Land, eastern Long Island, New York (Knight 1917), *L. davisii* later was recorded from Hyannis Port, Massachusetts, on Cape Cod (Knight 1923). Massachusetts was omitted as a state record in Carvalho's (1957) catalog but was included by Henry

and Wheeler (1988) in the most recent catalog of North American Heteroptera. The only other published records are from New York: Yaphank (Long Island) and Bear Mountain, north of New York City (Leonard 1928).

New records.—All specimens were collected from pitch pine by the author or (Connecticut) with T.J. Henry. Roman numerals denote nymphal instars. Voucher material has been deposited in the collections of the Pennsylvania Department of Agriculture, Harrisburg, and the National Museum of Natural History, Smithsonian Institution, Washington, DC (USNM).

CONNECTICUT: Windham Co., Windham Airport, 4 km NE of Willimantic, 1 Sept. 1991, 1 ♀. MAINE: York Co., Rt. 1, Kennebunk, 6 Sept. 2002, 2 ♂, 2 ♀; Rt. 4, 2.9 km S of jct. Rt. 109, 6.9 km SSE of Sanford, 7 Sept. 2002, 1 V. MASSACHUSETTS: Franklin Co., Montague Sand Plains, 3.5 km N of Montague, 14 Sept. 1991, 1 ♀ & 6 Sept. 2001, 1 ♀; Rt. 202, 5.3 km SSE of Orange, 8 Sept. 2002, 2 ♀. NEW HAMPSHIRE: Hillsborough Co., Rt. 102, 1.4 km S of Rockingham Co. line, 5.7 km NNE of Hudson, 8 Sept. 2002, 7 ♀; Merrimack Co., Concord Barrens, Rt. 9, 14 Sept. 1991, 1 ♀ & 12 Aug. 1993, 1 IV. NEW JERSEY: Sussex Co., High Point State Park, Kuser Rd. W of Lake Marcia, 16 Sept. 2001, 2 ♀. NEW YORK: Ulster Co., Mohonk Preserve, Bonticou Crag, 5 km NNW of New Paltz, 21 Aug. 1992, 2 V; Sam's Point Dwarf Pine Ridge Preserve, W of Lake Maratanza, NE of Cragmoor, 5 Sept. 2001, 5 ♂, 5 ♀ & 4 Sept. 2002, 4 ♂, 1 ♀. PENNSYLVANIA: Dauphin Co., Jefferson Twp., State Game Lands 210, 3 km SSE of Williamstown, 26–27 Sept. 1988, 2 ♀; Luzerne Co., Rt. 924, Humboldt, 2.3 km SW of jct. I-81, 17 Sept. 2001, 1 ♂, 4 ♀ & 3 Sept. 2002, 2 ♂, 5 ♀; Pike Co., Rt. 739, 1.5 km SE of Lords Valley, 16 Sept. 2001, 3 ♀ & 3 Sept. 2002, 2 ♀; Schuylkill Co., jct. Rt. 61 & I-81 south, 1.2 km S of Frackville, 4 Sept. 2001, 1 ♂. RHODE IS-

LAND: Providence Co., Slatersville, 19 Sept. 1992, 2 ♀.

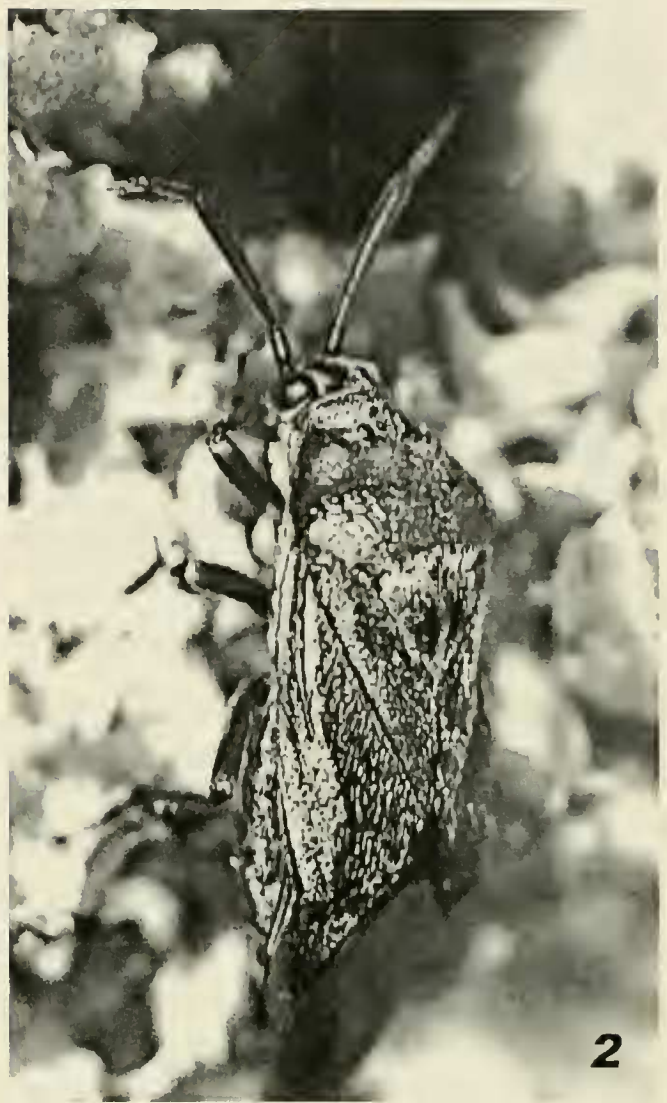
SEASONALITY

Except for a male collected on 10 August 1899 at Hyannis Port, Massachusetts, all other adults of *L. davisii* have been taken in September. The collection of equal numbers of males and females (5 of each) in Ulster County, New York, on 5 September 2001 and four males and one female on 4 September 2002 suggests that adults had been present for only a week or 10 days. Mirids typically are protandrous, the males appearing slightly earlier than the females and not living as long (Wheeler 2001). My latest collection of a male was 27 September in Dauphin County, Pennsylvania. The type series includes a pair taken *in copula* on 24 September 1910 (USNM collection).

Despite extensive collecting of mirids on pitch pine from May to September, I found only four nymphs: a fourth instar on 12 August at Concord, New Hampshire, two fifth instars on 21 August in Ulster County, New York, and a fifth instar (see Fig. 1) on 7 September in York County, Maine. Collections of *L. davisii* suggest that adults mostly appear from late August to early September. Assuming the date of 10 August given for the male taken on Cape Cod, Massachusetts, in 1899 is correct (Knight 1923), this plant bug sometimes appears earlier in the season. The presence of late instars in mid-to late August suggests that overwintered eggs do not hatch until after mid-July.

PLANT AND PREY ASSOCIATIONS

The mostly Neotropical tribe Clivinematini comprises 17 genera and 83 described species. Even though scant biological data are available, clivinematines are assumed to be predacious (Ferreira 1998). Two species of *Clivinema* and an *Ambrazius* species feed on ensign scales (Ortheziidae); a *Hemicerocoris* species preys on soft scales (Coccidae) (Ferreira 1998, Wheeler 2001). The habits of *Largidea* species are unknown, although Kelton (1980)



Figs. 1–2. *Largidea davisi*. 1, Fifth instar (York Co., Maine, 7 Sept. 2002). 2, Adult female (Ulster Co., New York, 5 Sept. 2001).

speculated that *L. shoshonea* Knight feeds on aphids.

Label data accompanying specimens of *Largidea* indicate that seven species are found on pines (*Pinus* spp.). Species of *Largidea* and its sister genus, the Neotropical *Adlargidea*, likely are restricted to developing on pines (Ferreira 1998).

I have collected mirids from all species of *Pinus* occurring in the Northeast and have found *L. davisi* only on pitch pine (*P. rigida* Mill.). “Pine,” recorded as the host at the type locality on Long Island, almost certainly refers to pitch pine. W.T. Davis and G.P. Engelhardt, who in 1910 collected the type specimens of this plant bug at Promised Land, Long Island, collected other heteropterans that year from pitch pine at Promised Land (see Davis 1911). Spec-

imens known historically from other localities—Cape Cod, Massachusetts; Bear Mountain, New York; and Yaphank, Long Island, New York—likely also were collected from *P. rigida*.

The habits of *L. davisi* on pitch pine have not been determined. A potential prey species on pitch pine is the margarodid scale *Matsucoccus gallicolus* Morrison. This pine-bast scale is found mainly on pitch pine and is known from nearly all areas where *L. davisi* has been collected. The margarodid is particularly common on Cape Cod, Massachusetts, and Long Island, New York, as well as in parts of Connecticut, New Jersey, and Rhode Island (Morrison 1939, Parr 1939). The globular saclike adult females of this infrequently collected scale insect were taken with *L. davisi* at Monta-

gue, Massachusetts, and in Dauphin, Luzerne, and Pike counties in Pennsylvania. In Luzerne County, Pennsylvania, the mirid and the margarodid were collected from the same branches of pitch pine. In addition, the co-occurrence of the anthocorid *Elatophilus inimicus* Drake & Harris, a known predator of *Matsucoccus* species (e.g., Mendel et al. 1991), suggests the presence of *M. gallicolus* at other localities where *L. davisii* was found. Populations of *Matsucoccus* predators, such as *Elatophilus* species, are more likely to be detected than those of their inconspicuous prey (Morrison 1939, Mendel et al. 1991).

DISCUSSION

Previously published records of *L. davisii* evidently are based on fewer than 15 specimens: 10 from the type locality on Long Island, New York (Knight 1917); one from Hyannis Port, on Cape Cod, Massachusetts (Knight 1923); and likely only one from each of the two other localities in New York (Leonard 1928). Fifty-six adults were collected during the present survey, ranging from York County, Maine, in the north to northern Dauphin County, Pennsylvania, in the south. In elevation, *L. davisii* has been taken near sea level on Long Island, New York, and on Cape Cod, Massachusetts, to about 685 m near Lake Maratanza in Ulster County, New York.

Largidea davisii appears to be an unusually late-season, univoltine mirid. The distinctive nymphs and adults are unlikely to have been overlooked during earlier-season collecting at sites where I found this plant bug in September, including the Montague Sand Plains in Massachusetts, the Concord Barrens in New Hampshire, the Mohonk Preserve and Sam's Point Dwarf Pine Ridge Preserve in New York, and pitch pine communities in Luzerne and Schuylkill counties in Pennsylvania.

Largidea davisii can be considered a characteristic, though uncommon and patchily distributed insect of northeastern pitch pine-scrub oak barrens and similar

communities. It appears to be the least common of the approximately 25 mirid species that develop on pitch pine (Wheeler, unpublished data). It was found in several remnant pine barrens, such as Concord, New Hampshire, and on scattered pitch pine trees in ruderal sites along highways, in addition to being collected in the extensive pine barrens in the Shawangunk Mountains of New York and the sand plains near Montague, Massachusetts. This mirid was not found in extensive pine barrens in southern Maine, such as Waterboro and Fryeburg; the Ossipee barrens in New Hampshire; the Albany (New York) Pine Bush; and the New Jersey Pine Barrens.

Future research should focus on elucidating the feeding habits of *L. davisii*, obtaining more information on its seasonal history, and determining whether pines other than *P. rigida* serve as hosts. Clivematines have been assumed to be predacious, the few available records of their habits indicating that scale insects serve as prey. *Cinara* species and other pine-associated aphids also were found on pitch pines with *L. davisii*, and Kelton (1980) suggested that *L. shoshonea* Knight might feed on aphids inhabiting jack pine, *Pinus banksiana* Lamb. For certain anthocorid species of the pine-associated genus *Elatophilus*, Kelton (1976) and others (cited by Mendel et al. 1991) speculated that these anthocorids are generalist predators on aphids or mites. But at least five species of *Elatophilus* now are known to be specialized predators of *Matsucoccus* scales, and an intimate association among *Elatophilus* species, pines, and pine-bast scales has been hypothesized (Mendel et al. 1991, cf. Lattin and Stanton 1993). My hypothesis that members of the pine-associated genus *Largidea* prey mainly on scale insects and that *L. davisii* feeds on a pine-bast scale, *Matsucoccus gallicolus*, awaits testing.

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